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| 09/816,177 | 03/26/2001 | Masaaki Hatano | 04329.2553 | 7586 |

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EXAMINER

MITCHELL, JAMES M

| | |
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| ART UNIT | PAPER NUMBER |
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2827

DATE MAILED: 01/06/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/816,177

Applicant(s)

MASAAKI HATANO

Examiner

James Mitchell

Art Unit

2827

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 December 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,13 and 15-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,13 and 15-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1 The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

2. Claims 1 and 15 are rejected under 35 U.S.C. 102(e) as being anticipated by Stamper et al. (U.S 2002/0053746).

3. Stamper (Fig 8; Par. 0069, Lines 13-18) discloses a Cu film (95) used as a wiring provided on a main surface (60) of a semiconductor substrate, an intermediate layer (134) formed at least on the Cu film, the intermediate layer comprising a TaN film at 40nm is 20nm or more formed on the Cu film and a Ta film formed on the TaN film and an Al film (132) formed on the Ta film and used as a pad, said intermediate layer comprising a first portion (bottom) which contacts said Cu film and a second portion (side) which does not contact said Cu but that is in contact with an insulating layer (129; Par. 0070, Lines 6-7); wherein said Al film having an extending portion under which the Cu film is not formed (extended portions of Al not covered by Cu film) and a conductive connection (139) member connected to the Al film.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 13 and 16-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stamper et al..

6. Stamper et al. does not appear to show that the thickness of the Ta film is 5nm or less, or a conductive connection member (bonding wire) connected to the Al film at the extending portion.

7. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to connect a conductive connection member (bonding wire) of Stamper at the Al film at the extending portion, since it has been held that a rearranging parts of an invention involves only routine skill in the art. *In re Japikse*, 86 USPQ 70.

8. Furthermore, the thickness of the film would have been obvious matter of design choice bounded by well known manufacturing constraints and ascertainable by routine experimentation and optimization to choose these particular dimensions, because applicant has not disclosed that the dimensions are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical, and it appears prima facie that the process would possess utility using another dimension. Indeed, it has been held that mere dimensional limitations are prima facie obvious absent a disclosure that the limitations are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical. See, for example, *In re Rose*, 220 F.2d 459, 105 USPQ 237 (CCPA

1955); In re Rinehart, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); Gardner v. TEC Systems, Inc., 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984); In re Dailey, 357 F.2d 669, 149 USPQ 47 (CCPA 1966).

9. Claims 1, 2 and 13 and 14-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chittipeddi.

10. Chittipeddi (Fig 14, 18, 20; Claim 1) discloses a Cu film (44) used as a wiring provided on a main surface (11) of a semiconductor substrate, an intermediate layer (55) formed at least on the Cu film, the intermediate layer comprising a tan film formed on the Cu film comprising a TaN film formed on the Cu film and a Ta film formed on the TaN film and an Al film (56) formed on the Ta film and used as a pad, said intermediate layer comprising a first portion (bottom) which contacts said Cu film and a second portion (side) which does not contact said Cu but that is in contact with an insulating layer (58); wherein said Al film having an extending portion under which the Cu film is not formed (extended portions of Al not covered by Cu film) and a conductive connection (61) member connected to the Al film.

11. Chittipeddi does not appear to show that the thickness of the Ta film is 5nm or less, that TaN (20nm and 40nm understood to be in relation to the TaN film; Application Page 15) has a thickness 20nm or 40nm or more or a conductive connection member (bonding wire) connected to the Al film at the extending portion.

12. In any case, see paragraph 8 .

Response to Arguments

13. Applicant's arguments filed December 16, 2002 have been fully considered but they are not persuasive. Applicant asserts that examiner has not established a prima facie case for obviousness and that examiner has provided no scientific reason, or basis in the cited art to motivate one skilled in the to select the claimed thickness. The basis as stated in the prior office action would be for routine experimentation and optimization, because it is within the level of one of ordinary skill in the art. Since this is a matter of mere dimensional limitation, any argument that a prima facie case for obviousness has not been established is moot, since it has been held that mere dimensional limitations are prima facie obvious absent a disclosure that the limitations are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical. Applicant has yet to demonstrate in its disclosure how these limitations are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical. Because these requirements haven't been met, applicant has not shifted the burden to require examiner to change the basis of his initial rejection. Furthermore there is case law (cited in the record) establishing that a prima facie case has been established when the changes of the invention are only to dimensional limitations. As such, examiner is unclear as to why applicant asserts that a prima facie case has not been established.

14. In response to applicant's suggestion that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was

within the level of ordinary skill at the time the claimed invention was made as indicated, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

15. Lastly, applicant's assertion that Chippeddi teaches away from the present invention is incorrect. As indicated by applicant, Chippeddi discloses only that the barrier layer (comprised of Ta/TaN) is between 100-1000 Angstroms (10-100nm). Therefore, the total thickness of Chippeddi's barrier is 10 –100nm that is within the thickness of applicant's 40nm TaN film and 5nm Ta film (sum of only 45nm). Since Chippeddi "sets no requirement for the barrier," examiner is unclear as to how applicant can assert that Chippeddi teaches away from applicant's invention, when Chippeddi through its silence has a scope of a 5nm Ta film and TaN thickness of 40nm.

Conclusion

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to James Mitchell whose telephone number is (703) 305-0244. The examiner can normally be reached on M-F 10:30-8:00.

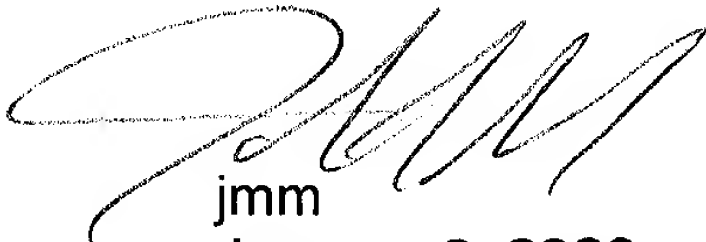
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David L. Talbott can be reached on (703) 305-9883. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-3432 for regular communications and (703) 305-3230 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.


jmm
January 2, 2003



DAVID E. GRAYBILL
PRIMARY EXAMINER